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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,264	01/11/2002	Satoshi Inaba	P 284163 01F181	6258

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EXAMINER

DICKEY, THOMAS L

ART UNIT PAPER NUMBER

2826

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/042,264

Applicant(s)

INABA, SATOSHI

Examiner

Thomas L Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 12-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-11 is/are rejected.
- 7) ☒ Claim(s) 6-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Election/Restriction

1. Applicant's election of the embodiment of figure 1 in Paper No. 8 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Accordingly, claims 12-46 are withdrawn as not reading on the elected embodiment.

Oath/Declaration

2. The oath/declaration filed on 11 January 2002 is acceptable.

Drawings

3. The formal drawings filed on 11 January 2002 are acceptable.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

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Information Disclosure Statement

5. The Information Disclosure Statements filed on 11 January 2002 and 14 March 2002 have been considered.

Specification

6. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. It is important that the abstract not exceed 250 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

7. The abstract of the disclosure is objected to because:

The abstract exceeds 250 words, and is not clearly indicative of the invention to which the claims are directed. Applicant should direct the abstract towards those having skill in the art of building high speed MOSFET and MISFET switching transistors. For example, the audience Applicant should seek to address would comprehend the words "An LDD MOSFET with shallow LDDs on both source and drain," as a substitute for lines 1-12 of the current abstract. Applicant is encouraged, but not required, to point out

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advantages of the invention and particular uses for the invention in the abstract. Correction is required. See MPEP § 608.01(b).

8. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1,4,5, and 11 are rejected under 35 U.S.C. 102(a) as being anticipated by KAWASHIMA (6,163,053).

Kawashima discloses a semiconductor device with a semiconductor substrate having a surface, a gate electrode 13 formed of a poly-silicon film over the surface of the semiconductor substrate with a gate dielectric 18 interposed therebetween, a pair of source and drain diffusion layers, each having a low resistivity region 152,154 and an extension region 194 being formed to extend from this low resistivity region 152,154 toward the channel region and being lower in impurity concentration and shallower in depth than the low resistivity region 152,154, formed in the semiconductor substrate to oppose each other with a channel region laterally residing therebetween at a location immediately beneath the gate electrode 13, a first impurity doped layer 19 of a first con-

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ductivity type formed in the channel region between the source/drain diffusion layers 152/154/194, a second impurity doped layer 156 of a second conductivity type selectively formed in a region immediately beneath the gate electrode 13, under the first impurity doped layer 19; and a third impurity doped layer 15 of the first conductivity type formed under the second impurity doped layer 156, wherein each of the first and second impurity doped layer 156s is formed in a layer on the semiconductor substrate with the third impurity doped layer 15 formed therein, wherein the first impurity doped layer 19 is equal to or less in junction depth than the extension region 194 of each of the source/drain diffusion layers (note that the first impurity doped layer is shown without a part # in figure 8c, and described as "another implantation ... channel regions" without a part # in column 7 lines 48-50 and 56-58) and the second impurity doped layer 156 is determined in impurity concentration and thickness to ensure that this layer is fully depleted (note column 2 lines 20-24) due to a built-in potential creatable between the first 19 and third 15 impurity doped layers. Note figures 5 through 8c, column 2 lines 20-24, column 7 lines 16-67, and column 8 lines 1-37 of Kawashima.

The applicant's claim 4 does not distinguish over the Kawashima reference regardless of the process used to form the first and second impurity doped layers, because only the final product is relevant, not the recited process of forming said layers into an undoped semiconductor layer as has been epitaxially grown.

Note that a "product by process" claim is directed to the product per se, no matter how actually made. In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown,

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173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over KAWASHIMA (6,163,053).

Kawashima discloses a semiconductor device with all the limitations of claims 2 and 3 except that the first impurity layer (the layer in which the channel is formed) is either partially or fully depleted. Note figures 5 through 8c, column 2 lines 20-24, column 7 lines 16-67, and column 8 lines 1-37 of Kawashima. It is noted that if the first impurity region is neither partially nor fully depleted, no channel can form, and the device will not

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function. Although Kawashima's device does not teach the exact types of depletion as that claimed by Applicant, the depletion differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.

B. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over KAWASHIMA (6,163,053) in view of CHEEK ET AL. (6,162,694).

Kawashima discloses a semiconductor device with all the limitations of claims 9 and 10 except that the gate electrode is formed of a metal film as contacted with the gate electrode film. Note figures 5 through 8c, column 2 lines 20-24, column 7 lines 16-67, and column 8 lines 1-37 of Kawashima.

However, Cheek et al. discloses a method for replacing polysilicon gate electrodes with metal gate electrodes. Note figure 1 of Cheek et al. Therefore, it would have been obvious to a person having skill in the art to replace the polysilicon gate electrodes of Kawashima's semiconductor device with the metal gate electrodes such as taught by Cheek et al. in order to reduce the conductivity and increase the electric field of the gate electrodes to thus provide a more compact, faster semiconductor device.

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Allowable Subject Matter

11. Claims 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Mon-Thu 8-6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Mon-Thu 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TLD
01/2003


Nathan J. Flynn
Primary Examiner